Technology and Marketing Alliances, 1996 – 2003

Abstract

This study examines the differences between marketing and technology alliances during the period that spans the recent rise and fall in technology stocks (1996-2003). The sample size for the two groups is 91 and 109 respectively. We find that although the abnormal returns at the announcement, based on the Fama-French model, are on average positive in technology alliances and zero in marketing alliances, the difference is not significant. Furthermore, irrespective of the type of alliance, the average dollar gain to the alliance partners (taken separately or together) is reliably zero. Firms in the two groups are similar in size, growth prospects, life cycle stage, and profitability. Cross-sectionally, in both the types of alliances, the higher the market-to-book asset ratio of firms the less favorable is the stock market response to the announcement. In technology alliances the market favors less profitable but financially secure firms, while it favors focus retaining firms in marketing alliances. Lastly, the larger alliance partner exhibits better bargaining power in technology alliances than in marketing alliances.

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Comments and suggestions appreciated.

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1. Introduction

The wave of strategic alliance activity in the U.S. continues unabated. A study reported that U.S. companies entered into 57,000 alliances in the six-year period between 1996-2001, and more than 5000 alliances were formed each year in 2002 and 2003 (Dyer, Kale, and Singh, 2004). This popularity in alliance formation runs counter to the spotty track record of alliance success. Research indicates that more than 70 percent of alliances fail, with 55 percent failing within the first three years. This seeming contradiction – tremendous popularity in alliance formation and poor track record of alliances – necessitates a close look at the phenomenon of strategic alliances.

Strategic alliances encompass a wide gamut of cooperative relationships whereby firms agree to pool their resources to pursue specific market opportunities. Typical motivations for entering into alliances range include conserving resources, sharing risks, obtaining information, accessing complementary resources, improving technological capabilities and enhancing reliability. The key to alliance success is in creating value in the partnership that would not be available singly. Value creation has been used as the metric to evaluate alliance success in a number of studies. Largely, these studies use the event study methodology to identify abnormal stock market returns following the alliance announcement.

There is considerable equivocality in the research findings, both in terms of value creation in alliances and the contrast between value creation in marketing and technology alliances. Support for value creation by alliance formation comes from Park, Mezias, and Song (2004), Socher (2004), and Chan, Kensinger, Keown, and

Martin (1997). In contrast, Das, Sen, and Sengupta (1998) find only weak support (not statistically significant) for the relationship between alliance formation and increase in stock price value. Also, while Park, Mezias, and Song (2004) report that marketing alliances generate significantly greater value than technology alliances, Das, Sen, and Sengupta (1998) and Chan, Kensinger, Keown, and Martin (1997) find just the opposite.

This equivocality in the research findings necessitates further research into the alliance phenomenon. Of particular interest is the advancement in event study methodology that results in more fine-grained analysis of abnormal stock returns than was possible in the past. Fama and French (2004) posit a model of asset pricing based on the growing evidence that average stock returns are related to the size of firms and to their market-to-book equity ratio. This is of particular relevance to event studies on strategic alliances because firms engaging in technology alliances are likely to be smaller and are likely to have higher market-to-book equity ratio compared to the firms engaging in marketing alliances (see the evidence in Das, Sen, and Sengupta 1998; and Chan, Kensinger, Keown, and Martin 1997). Extant event studies on strategic alliances use the market model which does not account for the relationship between stock returns and the size and market-to-book equity of firms and this could be one reason for the disagreement about their findings. To our knowledge, our study is the first one to use the Fama-French (2004) model for assessing the gains to the announcement of technology and marketing alliances.

For the period 1996-2003, we find that the abnormal returns to the firms announcing technology alliances are positive and to the firms announcing marketing alliances are zero, but the difference is not significant. The dollar gains are on average zero for the alliance partners considered individually or together in both the

types of alliances. On average, firms engaging in technology and marketing alliances are not different in size, growth prospects, profitability, and life-cycle stage. Also, irrespective of the type of the alliance, the market takes the announcement of an alliance by a firm to be to be a negative signal about its internal investment opportunity set. Despite these similarities, there are differences - the stock market favors less profitable but financially secure firms in technology alliances, but it favors the focus-retaining firms in marketing alliances. Finally, we find that the gains to the alliance partners are positively related to each other and to the combination (the relationships are less severe in marketing alliances) and that the bigger partners exhibit better bargaining power in technology alliances than in marketing alliances.

The rest of the paper is arranged as follows. In the next section we discuss the theoretical foundations and the testable hypotheses. In section3 we provide the details about the data and methodology. In section 4 we present our empirical findings and we wrap up with the summary and conclusions in section 5.

2. Theoretical Foundations

Research on strategic alliances has drawn from the resource-based view of the firm (e.g., Das and Teng, 2000), transaction cost theory (e.g., Williamson, 1985), and signaling theory (e.g., Gulati and Higgins, 2003). Such research has focused on various aspects of alliances including motivation to enter alliances, alliance governance, and alliance performance. Event studies have been used to study how, why, and for whom alliances create value. Studies that have looked at value creation of alliances have generally divided alliances into two functional categories: technological and marketing. Hagedoorn (1993) defined a technological alliance as

one that involved cooperation in upstream activities such as R&D, engineering, and manufacturing. In contrast, marketing alliances focused on downstream value creation activities such as sales, distribution, and customer service.

Motivation for forming strategic alliances stem from the need to reduce transaction costs as well as from the strategic importance of pooling valuable and complementary resources. Strategic alliances fall in between the two extremes of the market and the hierarchy and as such are used to reduce the costs associated with negotiation, coordination, and monitoring activities between two separate entities (Williamson, 1989). In addition, the resource-based view of the firm suggests that firms are motivated to combine complementary resources with a view to leveraging such resources for competitive advantage. Given the background of both cost reduction and resource augmentation, investors can be expected to react positively to strategic alliance announcements. This leads to:

H1: The formation of a strategic alliance results in a positive abnormal return.

Extant literature has looked at stock market reaction to both technological and marketing alliances. The results are equivocal. Das, Sen and Sengupta (1998) found evidence to support the view that technology alliances created more value than did marketing alliances. Their rationale was that since technology alliances involved sharing of knowledge, such sharing invariably comes with high transaction costs in any market-based transaction. Since strategic alliances reduce transaction costs, technology alliances are perceived as adding more value to the firm, hence higher abnormal returns. In contrast, marketing alliances signal that the firms contemplating it have reached the maturity or decline phases in their product life cycles. Such alliances are seen as signals of weaknesses and are perceived as essentially defensive in nature. Hence, investor expectations are lowered, resulting

in smaller abnormal stock return gains. In their study of 89 information technology companies, Neill, Pfeiffer, and Young-Ybarra (2001) found evidence to support the view that technology alliances result in significant positive abnormal returns. In contrast, Park, Mezias, and Song's (2004) empirical study of 272 alliances involving 69 e-commerce firms found that marketing alliances were considered more valuable (in terms of stock market reaction) than technology alliances. The arguments favoring technology alliances over marketing alliances are grounded in both transaction cost theory and the resource-based view of the firm. Technology alliances involve creation and sharing of knowledge. Intellectual property rights issues argue in favor of alliances over market-based relationships. In contrast, signaling theory indicates that when firms enter into marketing alliances, they are disseminating the message that their product-market portfolio needs help. As such, stock market reaction can be expected to skew in favor of technology alliances. This leads to:

H2: The formation of technology alliances results in greater positive abnormal than do announcements of marketing alliances.

Abnormal returns following a strategic alliance announcement may not be evenly distributed among the firms involved. Research has indicated that such distribution is a function of firm size. In general, the availability of technology specific to an industry or a product group is limited. It is not likely that several firms possess such a valuable technology at a given point in time. It is also likely that in the technology domain, smaller firms are more nimble in discovering new technologies than large firms. Pffefer and Salancik's (1978) resource dependence theory suggests that large firms are more dependent on alliances than small firms, particularly in the technology sector. In addition, as suggested by Sen, et. al (1998),

for large firms the prevalence of opportunistic behavior may be more significant in the technology area than in marketing. All this suggests that smaller partners stand to gain more than larger partners in alliances in general, and more so in technology alliances compared to marketing alliances. This leads to:

H3a: The formation of strategic alliances leads to greater abnormal gains for smaller partners than to larger partners.

H3b: The abnormal gains to smaller partners is greater in technology alliances than in marketing alliances.

3. Data and Methodology

The Lexis/Nexis database is our starting point for identifying strategic alliance announcement by exchange listed firms (partners could be non-exchange listed firms). We cover the eight year period 1996-2003 because it straddles the significant rise and decline of stock prices, especially of technology companies, in recent years. The starting sample is 303 firms. Lexus/Nexus provides data (primarily from PRO Newswire) pertaining to the date of alliance announcement along with some of the other relevant details such as the ticker symbol, and a general description of the nature of alliance, etc. The day on which Lexus/Nexus reports the alliance is taken as the day of announcement (day 0) and on the basis of the description about the alliance the sample is split into technology and marketing alliances (sample size 132 and 171 respectively). The restriction that firms be covered by the CRSP database reduces the sample sizes to 91 and 109 (total sample size 200; 3 technology and 1 marketing alliance firm were eliminated because they have less than 30 days of trading data during the year prior to the announcement).

The study primarily uses the Fama-French three factor model for assessing the abnormal stock price reaction at the announcement of an alliance. It considers the following as the return generating model (i.e., the model for 'normal' returns),

$$R_{jt} = \alpha_j + \beta_j (R_{mt}) + S_j (SMB_t) + H_j (HML_t) + \varepsilon_{jt}$$

R_{jt}, and R_{mt} are the daily return on stock J and the market portfolio. SMB_t is the difference between the daily return on small and big stocks and HML_t is the difference between the daily return on high book-to-market equity stocks and low book-to-market equity stocks at time t. α_j, β_j, S_j, and H_j are stock (i.e., firm) specific parameters and ε_{jt} represents random error. The study uses the period (-200, -50) relative to the day of alliance announcement (day 0) for estimating the parameters. See Fama and French (2004) for details about the asset pricing model associated with the return generating process stipulated above. The three factors (R_{mt}, SMB_t, and HML_t) are computed exactly as in Fama and French (1993). Stock price data is from the CRSP database, while accounting data is from COMPSUTAT. Abnormal return for a given day is computed as the difference between the realized return and the return predicted by the Fama-French model for that day. Cumulative Abnormal Returns (CARs) are computed for various windows around the event day (i.e., the day of alliance announcement).

For providing comparison with prior event studies pertaining to alliance announcements, the study also computes abnormal stock price reaction based on the market model. Here, 'normal' returns are assumed to be generated according to the following model,

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

R_{jt} and R_{mt} are the daily return on the stock of company J and on the market at time t respectively, α_j and β_j are the stock specific parameters, and ε_{jt} represents the

random error. We use the Scholes-Williams approach for estimating the parameters. The same window (day -250, -50) as in the Fama-French methodology is used for estimating the parameters of the market model.

The deviation of realized return from the return predicted by the model for normal returns for both the Fama-French model and the market model, standard parametric (based on Patell, 1976) and non-parametric (based on Corrado, 1989) test statistics are used for assessing the significance of abnormal returns (i.e., deviations of actual returns from 'normal' returns).

As an alternative to the time-series approach of estimating the above two models, we also apply the RATS (returns across time and securities) methodology developed by Ibbotson (1975). Here the Fama-French or the market model is cross-sectionally estimated for the firms in the sample on a daily basis and the intercept (from the cross-sectional regression) is taken to be the estimate of the average abnormal return experienced by firms in the sample.

For more details about the different models used for computing abnormal returns and/or test statistics, we refer the interested reader to the original studies.

4. Empirical Findings

The purpose of table 1 is to provide details about the sample used in this study. It also facilitates examination of the 'timing' of alliance announcements. The total sample size comprises of 200 CRSP listed firms that announce strategic alliances during the period 1996-2003. Of the 200 alliances tracked in this study, 91 are technology alliances while 109 are marketing alliances. Although the study covers only eight years, the wave like pattern in alliances (both technology and

marketing) is very noticeable (see panel A, table 1). [1] Alliance activity starts to increase as the real growth in GDP and stock prices are about to take a dive (perhaps managers anticipate that economic good times are about to end), it continues to stay at an elevated level during the downturn in economic conditions, and subsides when economic conditions start to improve. Although Chan, Kensinger, Keown, and Martin (1997) do not discuss the timing of alliance activity, their sample also exhibits a similar pattern – the alliance activity in their sample starts to increase prior to the crash of 1987 and continues at an elevated level after the crash (see their Panel A, table 1). The time-trend in alliance activity is suggestive of the view that strategic alliances are undertaken by firms in anticipation of or during economically distressed times.[2] Announcement of alliances may therefore signal negative information about the growth opportunities available to firms involved.

Extant research indicates that managers tend to use the weekends for releasing negative information about their company's prospects (e.g., Kross and Schroeder, 1984, Damodaran 1989, and Defusco, McCabe, and Yook 1992, among others). Alliance announcements made after the markets close on Fridays are likely to get reported in the financial press on Mondays and some may even spill over into Tuesdays. One would therefore expect the alliance announcements to increase on Mondays and Tuesdays. We find such to be the case. Monday and Tuesday combined account for over fifty percent of alliance announcement (technology as well

[1] To our knowledge no prior study has examined the issue of whether alliance activity exhibits a wave pattern over time and if so whether it is correlated in time with other wave patterns such as those in stock prices, economic growth, mergers, etc. This is an avenue for future research.

[2] We do not investigate the issue of how the alliance partners are performing relative to their peers. It may be that the firms engaged in alliances actually are performing better than their peers at the time of alliance formation, but they are preparing for the difficult times to come. It would be insightful to know how the peers perform subsequent to alliance formation relative to those engaged in alliances. We leave this is an avenue for future research.

as marketing) and the announcements tend to taper off on Thursdays and Fridays (see Panel B, Table 1).[3] Thus, the weekday timing of the alliance announcements also (like the time trend relative to economic conditions in Panel A) suggests that management is likely to perceive the announcement to be taken as a negative signal by the shareholders about their company. We also examined whether alliance announcements exhibit a 'monthly' pattern, but we find no evidence of this and so do not report the findings in the table.

Panel C of Table 1 partitions the sample firms according to their listing exchange. While the firms engaging in marketing alliances are about evenly split between NYSE/AMEX and Nasdaq, two out of three firms engaging in technology alliances are listed on the Nasdaq. This is not surprising given the fact that Nasdaq was heavily laden with technology companies during the dot.com era covered by our sample. Also, the proportion of firms that are listed on NYSE/AMEX is higher than the proportion of firms pursuing technology alliances. This too is not surprising because prior research indicates that the firms pursuing marketing alliances tend to be larger and more mature than those pursuing technology alliances (Das, Sen, and Sengupta, 1998) as are NYSE/AMEX firms compared to Nasdaq firms.

We start by exploring the abnormal returns around the announcement of alliances. Prior studies on strategic alliances that conduct an event study use the traditional one factor market model for estimating the abnormal returns. As discussed earlier, recent research on asset pricing strongly suggests that if an event is likely to constrain the cross-section of firms in a sample based on their size and

[3] The difference between the proportion of announcements made on Fridays compared to those on Mondays (or Tuesdays) is significant at the 1% level (for marketing and technology alliances taken separately or combined). Furthermore, the proportion of announcements on Fridays is significantly less than 20% (the proportion expected for Friday assuming no time trend in weekday announcements) at the 1% level. We do not report the test-statistics in the table to avoid clutter.

book-to-market equity, then the Fama-French three factor model would be a better weapon of choice than the market model for conducting an event study. We therefore compute the abnormal returns based on the Fama-French three factor model and use them in subsequent analysis. For maintaining comparability with prior research we do compute and report the abnormal returns based on the market model.

Table 2 displays the findings regarding the abnormal returns to the alliance firms for various windows around the day of alliance announcement. As the Panel A of Table 2 indicates, for the combined sample (technology + marketing alliances), the average cumulative abnormal return (CAR) for the period (-5, 5) is positive and significant at the conventional levels (2.57% according to the standard one factor market model, significant at the 5% level; 2.48% according to the Fama-French three factor model, significant at the 10% level). The average CAR is positive even according to Ibbotson's (1975) RATS method whether based on one factor market model or the three factor Fama-French model. For the combined sample, most of the gains during the period (-5, 5) come from the days immediately preceding the announcement (-5, -2). At the announcement, i.e., for the window (-1, 1) the gains are positive and after that the abnormal reaction is zero. Thus, on average the stock market reacts favorably to alliance announcements and there is some evidence of leakage to the market about the alliance immediately prior to the announcement.

There are, however, differences in the stock price reaction to alliance announcements depending on whether it is a technology or a marketing alliance. For the windows (-5, 5) and (-1, 1) around the alliance announcement, the average CAR is positive for technology alliances but zero for the marketing alliances (see Panels B and C, Table 2). Furthermore, for technology alliances, the abnormal stock

price reaction is clustered around the date of alliance announcement (-1, 1), but not much happens prior or after the announcement window. For marketing alliances, while not much happens around the actual announcement of the alliances, the CAR for the period (-5, -2) is positive. These findings indicate that while there is some leakage of information in the stock market about an impending marketing alliance, the market is caught relatively unaware by the announcement of a technology alliance.

The findings in Table 1 are generally supportive of the view taken in earlier studies that announcement of alliances by firms generate positive abnormal returns to their shareholders especially in the case of technology alliances (e.g., Chan, Kensinger, Keown, and Martin, 1997). We do, however, want to point out the fact that the abnormal returns associated with the alliances computed over different windows fail to exhibit statistical significance based on Corrado's (1989) non-parametric test. To our knowledge, none of the prior studies on strategic alliances report any non-parametric test statistic for cumulative abnormal returns around the announcement. One should therefore be cautious in taking the view that technology alliances generate positive abnormal returns to the shareholders.

At least some extant studies report a significant inverse relationship between the abnormal returns to the alliance firms and the size of the firms (see Das, Sen, and Sengupta, 1998; Chan, Kensinger, Keown, and Martin, 1997). We therefore compute the gains (in dollars) to the shareholders from an alliance as the product of the market value of equity of the firm twenty-one trading days prior to the day of announcement and the cumulative abnormal return around the date of announcement. More importantly, if the stock market is efficient (an implicit

assumption made in event studies), such a measure provides an assessment of the Net Present Value (in dollars) associated with the alliance.

Table 3 displays the average dollar gains associated with alliances for different windows surrounding the date of announcement. A completely different picture emerges compared to that in Table 2. The findings indicate that on average strategic alliances is a zero NPV project for the shareholders. Although the average dollar gain during the window (-1, 1) is positive for the full sample and the sub-sample of technology alliances, it is not statistically significant based on either the parametric or the non-parametric test. The gains are in fact negative (though not significant) when cumulated over longer windows surrounding the date of announcement. For marketing alliances, the average dollar gains are actually negative and significant for some windows based on either the parametric test or non-parametric test (in none of the cases both the tests indicate significance at the same time). Therefore, the findings clearly suggest that strategic alliances do not create value – at best they are a zero NPV project.

The findings in Tables 2 and 3 suggest that based on the average percentage returns and the dollar gains, the shareholders of firms announcing technology alliances fare better than the shareholders of firms announcing marketing alliances. Recall, however, that the findings lack statistical significance either based on the parametric test or on the non-parametric test and so we examine this issue further by analyzing the differences in mean and median abnormal returns and gains as well as the proportion of alliances in which the CARs are positive. Our findings are in Table 4 (here we use the CARs and cumulative abnormal gains based on the Fama-French model).

Irrespective of the window surrounding the date of alliance announcement, the mean as well as the median cumulative abnormal return in technology alliances is higher than in marketing alliances. Also, the proportion of alliances in which the CAR is positive is consistently higher in technology alliances than in marketing alliances. Except for the window (-10, 10), even the mean dollar abnormal gain in technology alliances is higher than in marketing alliances. The differences, however, are not statistically significant. Both the standard parametric test for difference of means and the non-parametric Wilcoxon sign-rank test indicate that cumulative abnormal returns and dollar abnormal gains in technology and marketing alliances are not statistically significant.[4] Even the median cumulative abnormal return or dollar gain are not statistically different and neither are the proportions of positive cumulative abnormal returns (to avoid clutter we do not report these test statistics in the table). Thus, the findings in Table 4, like those in Tables 2 and 3, indicate that although the average return and gain in technology alliances are better for the shareholders than in marketing alliances during the period 1996-2003, the difference is not significant.

The sample period roughly tracks the phenomenal rise and fall in the stock prices of technology stocks (the technology heavy Nasdaq index increased by about 85% during 1999 and then declined by nearly 40% during 2000 see Table 1). Evidence in Hagedoorn (1993) suggests that firms engaging in technology alliances are more likely to be high growth firms than those engaging in marketing alliances. This is very likely to be the case during the period covered in our study (1996-2003). Also, prior studies report that firms involved in technology alliances tend to be

[4] The exception is the mean dollar abnormal gains for the window (-1, 1) – only the parametric test indicates that this is higher in technology alliances than in marketing alliances.

larger than those involved in marketing alliances (Das, Sen and Sengupta 1998; Chan, Kensinger, Keown, and Martin, 1997). Market-to-book ratio of equity and size, according to Fama and French (2004), among others, are proxies for sources of non-diversifiable risk to investors and so are priced variables (i.e., affect equilibrium prices). We therefore examine the differences in the market based growth measures and size of firms involved in the two types of alliances. We present the findings in Table 5.

Panel A of Table 5 indicates that the market based measures of growth (price/earnings, price/sales, and the market/book ratio of equity or assets) although are all higher for firms involved in technology alliances compared to those involved in marketing alliances, the difference is not significant. In other words, firms that pursue technology or marketing alliances have similar growth prospects (at least according to their owners). What is interesting is the fact that the average price/earnings ratio for the S&P 500 stocks during the sample period is 29.3 (the p/e ratio went from 24.8 in January 1996 to 44.2 in December 1999 and back to 25.9 by December 2003; this is based on data used by professor Robert Shiller in his book *Irrational Exuberance*), while the average p/e ratio for firms that pursue technology alliances is 81.7 and 59.9 for firms that pursue marketing alliances. This suggests that firms announcing technology or marketing alliances during the period 1996-2003 are those that were considered to have substantially higher growth prospects than the average firm.

Panel B of Table 5 presents the findings on the differences in the size of firms involved in technology and marketing alliances. Although the market based size measures (market value of assets, taken as the market value of equity and book value of total debt; and market value of equity) suggest that firms engaged in

technology alliances are larger than those in marketing alliances, other measures such as sales, number of employees, and book value of assets suggest that the opposite is true. The difference in all these cases, however, is not statistically significant. In other words, like the market based measures of growth prospects, even the size of firms pursuing technology alliances is on average no different from that of firms pursuing marketing alliances.

Whether firms pursuing marketing alliances differ from those pursuing technology alliances on the basis of their market-to-book equity and/or size is an important issue because at least some researchers claim that these two variables proxy non-diversifiable components of risk borne by investors (see Fama and French 2004 for a review of literature on this issue). As these variables are not different for the technology and marketing alliance firms in our sample, their non-diversifiable risk measures (according to the Fama-French three factor model) are likely to be same. We confirm this by explicitly computing and comparing the risk measures for firms in the two groups (technology and marketing). We display the findings in Panel A of Table 6. What clearly comes through is the fact that the non-diversifiable risk dimensions of the firms in the two sets are not different whether computed using the three factor Fama-French model (beta, s measure, and h measure) or the one factor market model (beta).[5]

If the risk measures for two groups of firms are similar, their expected (normal) returns would be similar. The unexpected returns (abnormal returns)

[5] Although both the technology firms and marketing alliance firms load negatively on the HML factor in the Fama-French model, there is weak evidence that the former load more heavily than the latter. According to Fama and French (1995), this suggests that the former group is less financially distressed than the latter and so need lower compensation for the distress (HML) component of systematic risk. This is to some extent corroborated by our finding that the technology alliance firms in our sample have higher Altman Z scores and so are less financially distressed than the marketing firms (see Table 7, Panel B).

caused by an exogenous shock (event), however, would depend on the impact of the shock on the future of the firms and so could be very different for the two groups.[6] Our findings in Tables 2, 3, 4, 5, and 6 taken together indicate that firms with similar risk characteristic of equity pursue technology or marketing alliances during the period 1996-2003 and the impact of the alliance (dollar gains/losses resulting from the alliance) irrespective of the type of alliance is considered to be the same by their owners (shareholders). Our findings therefore do not support the contention in Das, Sen, and Sengupta, (1998) that gains in technology alliances would exceed those in marketing alliances. Our findings instead suggest that the relative gains in technology alliances compared to marketing alliances are likely to be different in different periods and so is an empirical issue.

While this study strongly argues in favor of using the Fama-French model instead of the market model for computing abnormal returns and gains resulting from strategic alliances, the difference between our findings and that in prior studies is not driven by the choice of our model. The correlations between the abnormal returns and gains computed using the two models is very high for our sample (see Panels B and C, Table 6). The correlations between the cumulative abnormal returns for different windows are in the range 0.99 – 0.89, and in the case of abnormal gains are in the range 0.98 – 0.73 (all have p-values of 0.001 or lower). Therefore even in cross-sectional analysis if the findings in this study differ from those in other studies that use the market model, the difference cannot be attributable to the choice of model for computing abnormal returns.

[6] e.g., consider two sets of firms in the same industry that have similar risk characteristics based on the current state of affairs. Assume that an unexpected exogenous shock occurs in the form of an earthquake that generates tsunamis devastating the operations of one group (located near the coast) more than the other. In such a case, the impact of the unexpected event could be very different for the two groups.

On the basis of the findings in Table 6 one may be tempted to draw the conclusion that it does not matter whether one uses the market model or the Fama-French model for computing abnormal returns associated with strategic alliances. Assume, however, that unlike in our sample, the technology alliance firms are smaller but have higher market-to-book equity ratios compared to the marketing alliance firms. Extant research indicates that expected returns on stocks are inversely related to the size and positively related to the market-to-book equity of firms even after accounting for the differences in the market betas of stocks (see Fama and French 2004 for a review of this literature). Therefore, a model that takes into account only the market beta (like the market model) will bias the expected returns downward for technology alliance and upwards for marketing alliances. Even if the impact of the alliance on the two groups of firms is the same (as what we find), such a model would be predisposed to indicate that the unexpected (i.e., abnormal) returns to technology firms are higher than that for marketing firms. We therefore reiterate the view that for assessing the impact on the shareholders of firms that announce strategic alliances, one would be better served by using a model that accounts for the cross-sectional differences in size, market-to-book equity, and the beta of firms (like the Fama-French model) than by using the one factor market model.[7]

Sen, Das and Dasgupta (1998) contend that unlike the firms pursuing technology alliances those that pursue marketing alliances are likely to be at the maturity or declining phase of their life cycle. We therefore examine whether the two groups differ in profitability and life cycle stage. The findings are in Table 7.

[7] In defense of prior studies we point out that much of the literature on the effect of differences in size and market-to-book equity ratio on stock returns had not been fully synthesized into a working model of asset pricing till recently.

For measuring profitability of firms, we examine their Return on Equity (Net Income/Equity), Return on Assets (Net Income/Total Assets) and return on Invested Capital (Net Income/Invested Capital; we take invested capital to be preferred stock + common equity + Long-term debt + Minority Interest). For the period 1996-2003, we find that on average there is no difference in the measures of profitability (ROE, ROA, and ROIC) of firms in the two groups (Panel A, Table 7).[8]

It is impossible for anyone to come up with an accurate measure of the life cycle stage of a firm. We assume that firms in the declining stage of their life cycle (relative to those in the early stage) are likely to be older, have lower growth rates of profits and/or sales, have high levels of absolute and/or normalized levels of free cash flows (from lack of good internal investment opportunities), and/or are likely to be more financially distressed.[9] For the period 1996-2003, we find that each of these measures for firms pursuing technology alliances is on average not different from those of firms pursuing marketing alliances (Panel B, Table 7). In other words, during the period 1996-2003, firms pursuing technology or marketing alliances are in the same stage of their life cycle.

Next, we examine the determinants of the cross-sectional differences in the abnormal returns to firms announcing strategic alliances. The findings are in Table 8. For the combined sample (technology + marketing alliances), the only variable with which the abnormal returns exhibit a relationship is the market-to-book asset ratio of firms. Extant studies often substitute this ratio for the Tobin's Q ratio and

[8] We follow the standard definitions for computing ROE, ROA, and ROIC. The measures of profitability are computed as on the last day of the fiscal year immediately prior to the alliance announcement (any 'extraordinary items' are ignored in computing the earnings of companies for these measures).

[9] We use the age since IPO, growth in earnings, growth in sales, actual level of undistributed cash flows, undistributed cash flows on a per share basis, and Altman's Z score as proxies for these variables. Undistributed cash flow is computed as in Lehn and Poulsen (1989) and is taken as a proxy for the firm's free cash flows.

so consider it to be the market's assessment of a firm's internal growth options (e.g., Moeller, Schlingemann, and Stulz, 2004). As the abnormal returns are inversely related to the market-to-book asset ratio, our finding suggests that the market considers the announcement of an alliance as a negative signal about the firm's internal growth options. Interesting differences in the cross-sectional determinants of announcement period abnormal returns, however, emerge when we separate the combined sample into technology and marketing alliances (see Panels B and C respectively).

First, we find that while abnormal returns to firms announcing technology alliances are inversely related to their profitability (Panel B, regressions 1 through 7), those announcing marketing alliances exhibit no such relationship (Table 8, Panels B and C, row 2). According to Das, Sen, and Sengupta (1998), profitable firms are likely to be the first movers in pursuing alliances and so are likely to bear the cost of exploitative hold-up behavior by the partner and hence earn lower abnormal returns compared to the less profitable firms. Furthermore, as gains from marketing alliances are likely to be less than from technology alliances, the inverse relationship would be more severe in marketing alliances than in technology alliances. Our findings provide mixed support for such a view. They instead suggest that whether a firm pursuing an alliance may be subject to hold-up exploitative behavior by its partner is an issue independent of the type of alliance and therefore the relative propensity for such behavior in technology and marketing alliances maybe different across time periods.

Second, we find that in both the types of alliances, the abnormal returns to firms announcing alliances are inversely related to their market-to-book asset ratio (Table 8, Panels B and C, row 2). Market-to-book asset ratio is often taken as a

proxy for a firm's growth options (e.g., Moeller, Schlingemann, and Stulz, 2004). Our findings therefore suggest that, irrespective of the type of alliance, the market perceives the announcement of an alliance by a firm as a negative signal about the firm's internal growth options and the higher the expectation about the growth options prior to the announcement the more the readjustment at the announcement.

Third, we find that the announcement period abnormal returns to the firms in marketing alliances are higher in focus retaining (same SIC) alliances, but the abnormal returns to firms in technology alliances are not affected by focus-retention (Table 8 Panels B and C, row 5). As discussed previously, marketing alliances are likely to involve sharing of expertise that is industry specific (e.g., expertise in sales, distribution, or customer service, see Hagedoorn, 1983 and Das, Sen and Sengupta, 1998), while technology alliances are likely to involve development of new technology and not just transfer of existing knowledge and so need not be restricted to the same industry (see Chan, Kensinger, Keown, and Martin, 1997). Therefore, we conjecture that marketing alliances are likely to be more successful if they retain industry focus (i.e., firms are not from different industries), while technology alliances could be successful even if they do not retain industry focus (i.e., the partners are from different industries) and this then affects the market's reaction towards focus-retaining marketing and technology alliances.

Fourth, we find a positive relationship between the announcement period abnormal returns and the Altman's Z score for firms announcing technology alliances, but we find no such relationship for firms announcing marketing alliances (Table 8, Panels b and C, row 6). This finding indicates that while the possibility of financial distress is not an important consideration for the stock market when firms announce a marketing alliance, however, it is an important consideration if firms

engage in technology alliance. One reason could be that technology alliances are likely to involve production of knowledge or new technology, i.e., an up stream value chain activity, while marketing alliances are likely to involve sharing of marketing know-how, i.e., a downstream value chain activity (see Hagedoorn, 1993). It is therefore important for the success of the alliance that the firms do not experience financial distress in technology alliances more so than in marketing alliances.

In cross-sectional regressions, we also find that, irrespective of the type of alliance, the abnormal returns at the announcements are not related to the size of firms (as measured by sales, or book assets or number of employees; we report the results only for sales), their leverage ratios, cash flows, or the age of firms. These findings suggest that alliances are not driven by agency considerations. Else the returns would have been positively related to the leverage ratios and/or inversely related to the cash flows of firms. The lack of relationship between the abnormal returns and the age of firms indicates that life-cycle stage is not a determinant of the abnormal returns associated with alliances.

Finally, we examine whether alliances create value (i.e., whether the gains to the partners taken together is positive) and we also examine the issue of how the partners share the gains from an alliance. In this analysis, we assume that the larger partner (based on the book value of assets) is the bidder firm, i.e., is the first movers and bids for the alliance to the target firms (smaller firm). For obvious reasons, we can only use matched pairs and this reduces the sample to 40 matched alliances.[10] We display the findings in Table 9.

[10] The sample ends up being half and half – 20 marketing paired alliance pairs and 20 technology paired alliances. Our sample size (40 cases) is comparable to the one in Das, Sen and Sengupta (n = 25 cases).

The gains to the bidders are on average negative, while the gains to the targets are positive, but they are not significantly different from each other or from zero (see Panel A). The gains to the alliance (bidder + target) are also on average negative but not significant. This finding indicates that on average strategic alliances is a zero NPV project for the alliance partners taken separately or together.

In Panel B, we first run a regression of the gains to the bidder against the gains to the alliance (bidder + target) in technology and marketing alliances. In both the cases, the intercept of the regression is zero. This implies that if total gain from an alliance is zero then the bidder's gain is zero. This suggests that there are no sunk costs that a bidder has to bear if the alliance fails to generate positive gains. The slope is positive (0.99, significant at 0.1% level) for technology alliances but relatively lower (-0.12, significant at 1% level) in marketing alliances. This suggests that, on average, if the gain from a technology alliance is one dollar then the bidder gets \$0.99, while if the gain is one dollar in a marketing alliance the bidder gets \$0.87 (0.99 – 0.12). Thus, the bidders exhibit better bargaining power in technology alliances than in marketing alliances.

Next, we examine whether alliances involve transfer of wealth. Here we run a regression of the gains to the bidders against the gains to the targets in technology and marketing alliances. The intercept is negative for technology alliances (-7,405.55, significant at the 10% level) and that for the marketing alliances is no different from that of technology alliances. This implies that if the gains to the targets are zero then the gains to the bidders are negative. This suggests that the targets can impose hold-up costs on the bidders in strategic alliances. The slope of the regression in technology alliances is positive (16.17, significant at the 5% level), but that in marketing alliances is lower by -15.02 (significant at the 10% level). This

finding implies that, on average, for a one dollar gain to the target in a technology alliance the bidder gains $16.17, while for a one dollar gain to the target in a marketing alliance the bidder gains $1.15 (16.17 – 15.02). This too suggests that relative to the targets the bidders extract better gains in technology alliances than in marketing alliances. As the slopes are positive for both the technology and marketing alliances, the evidence suggests that alliances do not involve just transfer of wealth from one partner to the other.

5. Summary and Conclusions

This study compares technology and marketing strategic alliances during the recent rise and fall in technology stocks (1996 – 2003). Firms engaging in technology alliances are likely to be smaller in size and have better price-to-book ratios than firms engaging in marketing alliances. The study therefore argues that one should be using the Fama-French model rather than the one factor market model for assessing any valuation impacts arising from the announcement of alliances.

Unlike prior studies that report announcement period abnormal stock returns to be positive especially for firms announcing technology alliances, our study finds that the abnormal returns are not reliably different from zero and not reliably different across the two groups (technology and marketing). In effect, this study finds that technology as well as marketing alliances are a zero NPV project for the alliance partners whether considered separately or together. Furthermore, this finding is not driven by the choice of the model (Fama-French) for assessing the gains, but is likely to be an artifact of the period covered in this study.

We find that, on average, not only the announcement period abnormal returns, but also the size, price-to-book ratios, profitability, and life-cycle stage of firms pursuing technology alliances and marketing alliances are not different. Also, the market considers the announcement of an alliance by a firm, irrespective of whether it is technology or marketing, as a negative signal about its internal growth options. Despite these similarities, the determinants of abnormal returns tell a different story for the two groups during our study period. The cross-sectional findings suggest that the first movers in technology alliances are more likely to experience exploitative hold-up behavior by their partners and that the financial viability of the partners is more important than in marketing alliances. In marketing alliances, the stock market favors those in which the partners are from the same industry, while it shows no such concern in technology alliances.

Finally, we find that while alliances do not involve just transfer of wealth from one partner to the other, the bigger partner exhibits better bargaining power against the smaller partner in technology alliances than in marketing alliances.

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Table 1
Sample Details

The sample covers technology and marketing alliances during the period January 1, 1996 to December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. Annual growth in GDP is taken from the Federal Reserve (St. Louis) website, while the annual return on the Dow Jones Industrial Average (DJIA) and the return on the Nasdaq Composite Index are from the Dow Jones and Nasdaq Inc. websites respectively.

Panel A **Sample breakdown by year**

Year	Marketing Alliances	Technology Alliances	Total Alliances	Real GDP Growth (%)	DJIA Return (%)	Nasdaq Return (%)
1996	4	8	12	4.49	26.01	22.71
1997	4	9	13	4.69	22.64	21.64
1998	13	5	18	4.24	16.10	39.63
1999	14	17	31	4.08	25.22	85.59
2000	23	33	56	1.86	-6.18	-39.29
2001	21	23	44	1.19	-7.10	-21.05
2002	7	8	15	1.91	-16.76	-31.53
2003	5	6	11	4.98	25.32	50.01
Total	91	109	200			

Panel B **Sample breakdown based on the day of alliance announcement**

	Monday	Tuesday	Wednesday	Thursday	Friday
Technology	20 %	34 %	24 %	16 %	6 %
Marketing	33 %	28 %	21 %	12 %	6 %

Panel C **Sample breakdown by exchange**

	NYSE/AMEX	Nasdaq
Technology	35 %	65 %
Marketing	47 %	53 %

Table 2
Abnormal returns to firms entering a strategic alliance around the announcement

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. The one factor market model uses the value-weighted CRSP index as the market proxy. The market model uses Scholes-Williams (1977) betas. The Fama-French three factor model uses Rm, SMB, and HML as computed in Fama and French (1993). The table reports significance levels based on both parametric (Patell, 1976) and non-parametric tests (Corrado, 1989) except in the case of the RATS method (Ibbotson, 1975) which uses only the parametric test. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in parametric tests, while the alphabets x, y, and z represent similar levels in non-parametric tests.

Panel A **All Alliances: Cumulative Abnormal Returns (%)**

Sample Size = 200	One Factor Model		Fama-French Three Factor Model	
Window	Market Model	RATS Model	Time-Series Model	RATS Model
(-20, 0)	2.48	3.45 [b]	1.92	2.64 [c]
(1, 20)	-0.37	1.29	0.05	0.65
(-5, 5)	2.57 [b]	3.57 [b]	2.48 [c]	3.16 [b]
(-5, -2)	1.55 [b]	1.74 [b]	1.18 [c]	1.42 [b]
(-1, 1)	1.19 [c]	1.56 [c]	1.31	1.44 [c]
(2, 5)	-0.17	0.37	0.00	0.30

Panel B **Technology Alliances: Cumulative Abnormal Returns (%)**

Sample Size = 91	One Factor Model		Fama-French Three Factor Model	
Window	Market Model	RATS Model	Time-Series Model	RATS Model
(-20, 0)	4.49 [b]	3.48	3.12	2.65
(1, 20)	1.27	1.64	1.85	0.94
(-5, 5)	3.73 [b]	3.81 [b]	3.15 [c]	3.85 [b]
(-5, -2)	1.06	1.04	0.87	1.01
(-1, 1)	2.40 [a]	2.35 [b]	1.73 [c]	2.53 [c]
(2, 5)	0.27	0.41	0.19	0.31

Panel C **Marketing Alliances: Cumulative Abnormal Returns (%)**

Sample Size = 109	One Factor Model		Fama-French Three Factor Model	
Window	Market Model	RATS Model	Time-Series Model	RATS Model
(-20, 0)	0.82	3.07	0.92	2.38
(1, 20)	-1.72	0.79	-1.45	0.22
(-5, 5)	1.61	3.23 [c]	1.93	2.84 [c]
(-5, -2)	1.93 [c]	2.06 [c]	1.60	1.76 [c]
(-1,1)	0.19	0.86	0.48	0.81
(2, 5)	-0.53	0.30	-0.15	0.27

Table 3
Abnormal gains around the announcement to firms entering into a strategic alliance

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. The market model MM (one factor model) uses Scholes-Williams (1977) betas and the value-weighted CRSP index as the market proxy. The Fama-French FF (three factor) time series model uses Rm, SMB, and HML as computed in Fama and French (1993). Abnormal gains to a firm are computed as the abnormal return for a given window multiplied by its market value of equity 21 trading days prior to the alliance announcement. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in parametric tests, while the alphabets x, y, and z represent similar levels in non-parametric tests.

Abnormal Gains ($ mill)

	All Alliances		Technology Alliances		Marketing Alliances	
Window	Market Model	Fama-French Model	Market Model	Fama-French Model	Market Model	Fama-French Model
(-1, 1)	33.59	47.63	795.74	796.30	-602.75	-577.40 [c]
(-5, 5)	-448.49	-326.43	-228.02	-130.21	-632.56	-490.25
(-10, 10)	-866.97	-629.00	-968.42	-666.92	-782.27 [z]	-597.34
(-20, 20)	-1501.61	-887.14	-771.30	-289.81	-2111.31 [c]	-1385.84 [c]
Sample Size	200	200	91	91	109	109

Table 4
Differences in the abnormal stock price reaction of firms entering into strategic alliances: technology vs. marketing

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. The abnormal stock price reaction (in percent and in dollars) is based on the Fama-French three factor model (Rm, SMB, and HML are computed as in Fama and French, 1993) model. Abnormal gains to a firm are computed as the abnormal return for a given window multiplied by its market value of equity 21 trading days prior to the alliance announcement. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in the standard difference of means parametric test, while the alphabets x, y, and z represent similar levels in the Wilcoxon sign-rank non-parametric test.

Panel A **Differences in the mean abnormal returns (%)**

Window	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
(-1, 1)	1.73 (-0.13) [49]	0.48 (-0.30) [47]	1.20	0.35
(-5, 5)	3.15 (0.16) [51]	1.93 (0.50) [52]	0.54	0.37
(-10, 10)	5.66 (1.59) [52]	0.74 (-1.15) [44]	1.61	1.37
(-20, 20)	4.98 (-1.80) [46]	-0.53 (-3.26) [44]	1.34	0.49
Sample Size	91	109		

Mean (Median) [percent positive]

Panel B **Differences in the mean abnormal gains ($ mill)**

Window	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
(-1, 1)	796.30 (0.01)	-577.40 (-1.61)	2.04 [b]	0.77
(-5, 5)	-130.21 (0.61)	-490.25 (0.93)	0.29	0.32
(-10, 10)	-666.92 (3.12)	-597.34 (-8.27)	0.04	1.04
(-20, 20)	-289.81 (-2.4)	-1385.84 (-24.94)	0.49	0.49
Sample Size	91	109		

Mean (Median)

Table 5
Differences in growth and size measures of firms entering into strategic alliances: technology vs. marketing

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. All the variables in this table are as on the last day of the fiscal year immediately prior to the date of alliance announcement. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in the standard difference of means parametric test, while the alphabets x, y, and z represent similar levels in the Wilcoxon sign-rank non-parametric test. All the variables are as on the last day of the fiscal year immediately prior to the alliance announcement.

Panel A **Growth Measures: Difference of Means**

	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
Price/Earnings	81.71 [n=57]	59.92 [n=69]	1.33	1.24
Price/Sales	6.32 [n=73]	4.89 [n=80]	1.08	0.74
Market/Book Equity	5.59 [n=90]	5.30 [n=101]	0.15	1.39
Market/Book Assets	5.30 [n=90]	5.07 [n=101]	0.13	1.33

[n=sample size]

Panel B **Size Measures: Difference of Means**

	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
Market Value of Assets ($ mill)	54,910 [n=90]	45,299 [n=101]	-0.52	-0.12
Market Value of Equity ($ mill)	51,663 [n=90]	35,383 [n=101]	-0.98	-0.08
Sales ($ mill)	9,713 [n=90]	10,608 [n=108]	0.28	0.44
Book Assets ($ mill)	12,758 [n=91]	29,867 [n=108]	1.35	0.35
Num. of Employees	33,942 [n=88]	42,241 [n=105]	0.78	0.73

[n=sample size]

Table 6
Risk measures and correlations between the abnormal returns: market model vs. Fama-French model

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. The market model (MM) uses the value-weighted CRSP index as the market proxy and Scholes-Williams (1977) betas for computing the abnormal returns around alliance announcements. The Fama-French (FF) model uses Rm, SMB, and HML as computed in Fama and French (1993). Abnormal gains are computed as the product of the abnormal returns for a given window and the market value of equity 21 trading days prior to the alliance announcement. The abnormal returns and gains based on the market model and the FF model are matched for each firm for computing Pearson Correlations. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels respectively for testing the null that the correlation coefficient is zero. The sample sizes for the full sample and the technology and marketing sub-samples are 200, 91, and 109 respectively.

Panel A **Risk Measures of Stocks: Difference of Means**

	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
Beta (FF)	1.14	1.15	0.10	0.03
S Measure (FF)	0.51	0.73	1.42	0.93
H Measure (FF)	-0.50	-0.21	1.50	1.96 [y]
Beta (MM)	1.32	1.38	0.49	0.41

Panel B **Correlations between MM and FF cumulative abnormal returns**

Window	All Alliances	Technology	Marketing
(-1,1)	0.99 [a]	0.99 [a]	0.98 [a]
(-5, 5)	0.95 [a]	0.94 [a]	0.96 [a]
(-10, 10)	0.95 [a]	0.94 [a]	0.93 [a]
(-20, 20)	0.92 [a]	0.95 [a]	0.89 [a]

Panel C **Correlations between MM and FF cumulative abnormal gains**

Window	All Alliances	Technology	Marketing
(-1,1)	0.98 [a]	0.99 [a]	0.98 [a]
(-5, 5)	0.95 [a]	0.97 [a]	0.86 [a]
(-10, 10)	0.95 [a]	0.98 [a]	0.73 [a]
(-20, 20)	0.93 [a]	0.97 [a]	0.87 [a]

Table 7
Differences in profitability and life-cycle maturity measures of firms entering into strategic alliances: technology vs. marketing

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as the date of alliance announcement. All the variables in this table are as on the last day of the fiscal year immediately prior to the date of alliance announcement. Earnings exclude extraordinary items. IC (invested capital) is taken as preferred stock + common equity + L. T. Debt + minority interest. Earnings and sales growth is based on three years of data for the years preceeding the date of alliance announcement. Altman's Z score, a measure of financial distress, is computed as in Altman (1968). A Z-score < 1.8 suggests high likelihood of distress, while a Z-Score > 3.0 suggests low likelihood of distress. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in the standard difference of means parametric test, while the alphabets x, y, and z represent similar levels in the Wilcoxon sign-rank non-parametric test.

Panel A **Profitability Measures: Difference of Means**

	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
ROE (%)	5.88 [n=86]	7.19 [n=96]	-0.35	-0.92
ROA (%)	-0.64 [n=91]	-2.95 [n=107]	0.82	0.20
ROIC (%)	3.84 [n=87]	1.40 [n=101]	0.64	0.32

[n = sample size]

Panel B **Life Cycle Measures: Difference of Means**

	Technology	Marketing	Parametric T-Statistic	Non-Parametric Z-Statistic
Age since IPO (years)	4.49 [n=53]	4.18 [n=56]	0.49	0.48
EPS Growth (%)	-25.32 [n=72]	15.55 [n=88]	-1.26	-1.28
Sales Growth (%)	32.38 [n=76]	44.61 [n=91]	-1.14	-1.09
Free Cash Flows ($mill)	770.13 [n=85]	462.76 [n=98]	0.82	0.41
Free Cash Flow Per Share ($)	-0.57 [n=85]	0.11 [n=98]	-1.24	-0.52
Altman's Z Score	10.99 [n=87]	7.66 [n=95]	1.37	1.25

[n = sample size]

Table 8
Cross-sectional regressions of the abnormal returns to firms entering strategic alliances on their profitability, size, and other relevant measures

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. The dependant variable in the cross-sectional regressions, CAR (-5 5), is computed based on the Fama-French three factor model. Independent variables that need information from the financial statements of companies involved in alliances are taken as on the last day of the fiscal year immediately prior to day 0. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels respectively. Whites (1980) correction for hetroskedasticity is used for computing the t-statistic (in parenthesis) wherever necessary. The significance levels for the R^2 value indicates whether R^2 is different from zero (based on F-Statistic).

Panel A	**All Alliances**							
	1	2	3	4	5	6	7	8
Intercept	0.0286 (2.4) [a]	0.0327 (3.0) [a]	0.0343 (2.4) [a]	0.0294 (2.0) [b]	0.0251 (1.7) [a]	0.0228 (1.3)	0.0275 (1.1)	0.0602 (1.1)
ROIC	-0.0007 (-1.7) [c]	-0.0007 (-1.6)	-0.0007 (-1.6)	-0.0007 (-1.5)	-0.0007 (-1.4)	-0.0006 (-1.1)	-0.0012 (-1.9) [c]	-0.001 (-1.5)
M/B Assets		-0.0011 (-2.6) [a]	-0.0011 (-2.5) [a]	-0.0015 (-3.1) [a]	-0.002 (-2.6) [a]	-0.002 (-1.7) [c]	-0.009 (-2.3) [b]	-0.018 (-2.0) [b]
Sales ($ bill)			-0.0001 (-0.5)	-0.0002 (-0.6)	-0.0003 (-0.6)	-0.0002 (-0.3)	-0.0001 (-0.1)	0.0041 (0.7)
Dummy=1 Same SIC				0.0474 (1.3)	0.0472 (1.1)	0.0541 (1.4)	0.0411 (0.9)	0.0683 (0.9)
Altman's Z-Score					0.0009 (0.8)	0.001 (1.1)	0.0032 (2.1) [b]	0.0049 (2.1) [b]
Cash Flows ($ bill)						-0.0031 (-0.5)	-0.0004 (-0.0)	0.0001 (1.2)
Leverage Ratio							0.0289 (0.4)	0.1312 (0.9)
Age Since IPO (years)								-0.0079 (-1.0)
Sample Size	188	184	184	184	168	160	120	61
Adj. R^2	0.01 [c]	0.01	0.01	0.01	0.01	0.01	0.05 [c]	0.04

ROIC	=	Return on Invested Capital (Net Income/ Invested Capital). Net Income excludes extraordinary items. Invested Capital = Long-term debt + Preferred Stock + Common equity + Minority Interest.
M/B Assets	=	(MV of Equity + BV of Total Debt)/BV of Assets.
SIC Dummy	=	1 if the first 3 digits of the SIC code are same, = 0 otherwise.
Z-Score	=	Computed as in Altman (1968).
Cash Flows	=	Undistributed Cash Flows/Total Assets; Undistributed Cash flows are taken to be the Operating income before depreciation minus interest expense, taxes, preferred dividends, and common dividends (see Lehn and Poulsen, 1989).
Leverage Ratio	=	(Total Debt/Assets).
Age since IPO	=	Number of years the firm has existed since the IPO

Panel B	Technology Alliances							
	1	2	3	4	5	6	7	8
Intercept	0.0456 (2.5) [a]	0.0552 (2.6) [a]	0.0528 (2.3) [b]	0.0526 (2.3) [b]	0.0443 (1.8) [c]	0.0450 (1.7) [c]	0.0447 (1.1)	0.0758 (0.9)
ROIC	-0.0017 (-2.3) [a]	-0.0016 (-2.2) [b]	-0.0017 (-2.2) [b]	-0.0017 (-2.2) [b]	-0.0019 (-2.4) [b]	-0.0019 (-2.3) [b]	-0.0020 (-2.4) [b]	-0.0019 (-1.5)
M/B Assets		-0.0023 (-1.0)	-0.0022 (-0.9)	-0.0022 (-0.9)	-0.0111 (-2.4) [b]	-0.0113 (-2.4) [b]	-0.0167 (-1.7) [b]	-0.0283 (-1.8) [c]
Sales ($ bill)			0.0002 (0.3)	0.0002 (0.3)	0.0010 (0.8)	0.0009 (0.7)	0.0010 (0.7)	-0.0116 (-0.7)
Dummy=1 Same SIC				-0.0020 (-0.0)	-0.0147 (-0.2)	-0.0109 (-0.3)	0.0013 (0.0)	0.1699 (0.9)
Altman's Z-Score					0.0042 (2.3) [b]	0.0041 (2.2) [b]	0.0051 (2.1) [b]	0.0067 (1.9) [c]
Cash Flows ($ bill)						0.0025 (0.3)	0.0084 (0.3)	-0.4260 (-0.9)
Leverage Ratio							0.0247 (0.2)	0.3745 (1.3)
Age Since IPO (years)								-0.0145 (-1.2)
Sample Size	87	86	86	86	82	78	56	31
Adj. R^2	0.05 [b]	0.05 [b]	0.01	0.02	0.8 [b]	0.06 [c]	0.05	0.03

Panel C	Marketing Alliances							
	1	2	3	4	5	6	7	8
Intercept	0.0163 (1.1)	0.0189 (1.2)	0.0253 (1.4)	0.0129 (0.7)	0.0108 (0.4)	0.0025 (0.1)	-0.0101 (-0.5)	-0.0421 (-0.7)
ROIC	-0.0001 (-0.3)	-0.0002 (-0.3)	0.0000 (-0.0)	0.0001 (0.2)	0.0001 (0.2)	0.0006 (0.6)	-0.0002 (-0.2)	0.0000 (0.2)
M/B Assets		-0.0008 (-2.0) [b]	-0.0009 (-2.2) [b]	-0.0016 (-1.6)	-0.0019 (-1.7) [c]	-0.0020 (-1.8) [c]	-0.0040 (-1.8) [c]	-0.0133 (-1.8) [c]
Sales ($ bill)			-0.0005 (-0.1)	-0.0007 (-1.0)	-0.0010 (-1.2)	-0.0008 (-0.8)	-0.0010 (-0.8)	-0.0087 (-0.7)
Dummy=1 Same SIC				0.0901 (2.3) [b]	0.0994 (2.2) [b]	0.1288 (2.7) [a]	0.1330 (2.7) [a]	0.1621 (2.3) [b]
Altman's Z-Score					0.0007 (0.4)	0.0011 (0.7)	0.0021 (0.7)	0.0049 (1.4)
Cash Flows ($ bill)						-0.0093 (-1.2)	-0.0048 (-0.5)	0.1020 (1.4)
Leverage Ratio							0.1058 (1.2)	0.0763 (0.5)
Age Since IPO (years)								0.0071 (0.8)
Sample	101	98	98	98	86	82	64	30
Adj. R^2	0.00	0.00	0.00	0.03	0.03	0.04	0.08	0.25 [b]

Table 9
Abnormal gains to bidders, targets, and the combinations involved in strategic alliances

The sample covers technology and marketing alliances entered between January 1, 1996 and December 31, 2003. The day of first mention in the Wall Street Journal about the takeover is taken as day '0'. Abnormal gain to an alliance partner is computed as the abnormal return based on the Fama-French model for the window (-5,5) around the day of alliance announcement multiplied by its market value of equity twenty trading days prior to the announcement. The larger of the alliance partners (based on book value of assets) is taken as the bidder and the smaller partner is taken as the target. The total gain to an alliance is taken as the sum of the gains to the bidder and the target. The alphabets a, b, and c represent significance at the 1%, 5% and 10% levels in the standard difference of means parametric test, while the alphabets x, y, and z represent similar levels in the Wilcoxon sign-rank non-parametric test. In Panel B, Whites (1980) correction for hetroskedasticity is used in computing the t-statistic (in parenthesis) wherever necessary. The significance levels for the R^2 value indicates whether R^2 is different from zero (based on F-Statistic).

Panel A **All Alliances**

	Abnormal Gains ($ mill)			Difference of Means (Bidders and Target)	
Windows	Total	Bidders	Targets	Parametric T-Statistic	Non-Parametric Z-Statistic
(-1, 0)	-822 (-99)	-914 (-93)	92 (-2)	0.9	1.9 [z]
(-5, 5)	-2,495 (7)	-2678 (-45)	183 (11)	1.2	1.5
(-10, 10)	-2,798 (2)	-3090 (-52)	291 (6)	1.1	1.4
(-20, 20)	-3,509 (-387)	-3911 (-408)	402 (-5)	1.5	2.0 [z]
Sample Size	40	40	40		

Mean (Median)

Panel B **Relationship between Bidder, Target, and Total Gains**

	A_0	A_1	B_0	B_1	Sample Size	Adj. R^2
Bidder Gains = A_0 + A_1(Dummy) + B_1(Total Gains) + B_2(Dummy)(Total Gains)						
	-236.16 (-0.9)	-133.96 (-0.4)	0.99 (89.2) [a]	-0.12 (-3.1) [a]	40	0.98 [a]
Bidder Gains = A_0 + A_1(Dummy) + B_1(Target Gains) + B_2(Dummy)(Target Gains)						
	-7405.55 (-1.9) [c]	5493.07 (1.1)	16.17 (2.2) [b]	-15.02 (-2.0) [c]	40	0.06

Dummy = 1 if Marketing, = 0 if Technology